13. A flywheel assembly for a power transmission system for transmitting engine torque ~~to a driven unit~~, comprising:

an elastic plate secured to a crankshaft to rotate therewith;

a flywheel body secured to said elastic plate and having an engaging surface for engaging with a clutch disc; and

a reinforcing member for reinforcing said elastic plate at a portion of said elastic plate which is secured to said crankshaft;

said elastic plate having an axial rigidity in the range of 600 kg/mm to 2200 kg/mm so as to ensure transmission of engine torque through said flywheel assembly ~~to said driven unit~~, while decreasing noise produced by a bending vibration of said crankshaft;

wherein said elastic plate is clamped axially between said reinforcing member and a shaft end of said crankshaft, said flywheel body comprises a central hole, and said reinforcing member is received concentrically in said central hole with a clearance allowing ~~whereby~~ said flywheel body to move ~~is movable~~ axially relative to said reinforcing member during operation.

14. A flywheel assembly for a power transmission system for transmitting engine torque ~~to a driven unit~~, comprising:

an elastic plate secured to a crankshaft to rotate

therewith;

a flywheel body secured to said elastic plate and having an engageable surface for engaging with a clutch disc; and

a reinforcing member for reinforcing said elastic plate at a portion of said elastic plate which is secured to said crankshaft;

said engageable surface having an axial run-out which is equal to or less than 0.1 mm;

wherein said elastic plate is clamped axially between said reinforcing member and a shaft end of said crankshaft, said flywheel body comprises a central hole, and said reinforcing member is received concentrically in said central hole with a clearance allowing whereby said flywheel body is movable to move axially relative to said reinforcing member during operation.

15. A flywheel assembly comprising:

a driving shaft crankshaft (1) for transmitting torque;

a circular elastic member plate (2) comprising an outer portion and an inner portion and extending radially inwardly from said outer portion to said inner portion, said inner portion of said elastic member plate being fastened to a shaft end of said driving shaft crankshaft;

an annular flywheel member body (5) comprising an outer

portion and an inner portion and extending radially inwardly from said outer portion to said inner portion of said flywheel member, said outer portion of said flywheel ~~member~~ body being fastened to said outer portion of said elastic ~~member~~ plate, said inner portion of said flywheel ~~member~~ body comprising a central circular hole; and

a reinforcing member (4) comprising a cylindrical portion (4a) axially extending from a first member end to a second member end, an inner portion extending radially inwardly from said first end of said cylindrical portion, said inner portion of said reinforcing member being fastened to said shaft end of said ~~driving shaft~~ crankshaft, said cylindrical portion of said reinforcing member being fit in said circular hole of said flywheel ~~member~~ body with a clearance to form a ~~loose~~ fit;

wherein said inner portion of said elastic ~~member~~ plate is fixedly clamped between said shaft end of said driving shaft and said inner portion of said reinforcing member, said inner portion of said flywheel ~~member~~ body is ~~loosely~~ fit over said cylindrical portion of said reinforcing member, and said reinforcing member allows axial movement of said inner portion of said flywheel body relative to said inner portions of said elastic ~~member~~ plate and said reinforcing member.

16. A flywheel assembly for a power transmission system for transmitting engine torque ~~to a driven unit~~, comprising:

a crankshaft;

an elastic plate comprising an inner portion secured to a shaft end of said crankshaft;

a flywheel body secured to said elastic plate and having an ~~engageable~~ engaging surface for engaging with a clutch disc; and

a reinforcing member for reinforcing said elastic plate at said inner portion of said elastic plate;

wherein said elastic plate has an axial rigidity in the range of 600 kg/mm to 2200 kg/mm so as to ensure transmission of engine torque ~~to said driven unit~~ through said flywheel assembly, while decreasing noise produced by a bending vibration of said crankshaft; and

wherein said elastic plate is clamped axially between said reinforcing member and said shaft end of said crankshaft.

17. A flywheel assembly as set forth in Claim 16, wherein said flywheel body comprises an inner portion defining a circular central hole, and an outer portion surrounding said inner portion of said flywheel body; said elastic plate comprises an outer portion which surrounds said inner portion of said elastic plate and which is fixed to said outer portion of said flywheel body; said reinforcing member is fit in said

central hole of said flywheel body with a clearance to form a loose fit; and said reinforcing member comprises ~~a smooth~~ an outer circumferential surface for allowing said inner portion of said flywheel body to move axially to said elastic plate without limiting an axial movement of the inner potion of said flywheel body toward said elastic plate.

18. A flywheel assembly as set forth in Claim 17, wherein said reinforcing member extends axially from a first member end defined by a radially extending abutment surface held in contact with said elastic plate, to a second member end; said ~~smooth~~ outer circumferential surface of said reinforcing member extends ~~smoothly~~ from said abutment surface toward said second member end of said reinforcing member; said ~~smooth~~ outer circumferential surface of said reinforcing member comprises an outer cylindrical surface section fit in said central hole of said flywheel body, and an outer ~~smooth~~ curved surface section which extends continuously ~~and smoothly~~ from said outer cylindrical surface section to said abutment surface; and said ~~smooth~~ curved surface section is a surface of revolution whose diameter decreases continuously ~~smoothly~~ from a diameter of said cylindrical surface section toward said abutment surface.

19. A flywheel assembly as set forth in Claim 18, wherein said flywheel body comprises a side surface facing toward said elastic plate, and said ~~engageable~~ engaging surface which faces away from said elastic plate and which extends in an imaginary flat ~~surface~~ plane; and said second member end of said reinforcing member is located axially between said ~~engageable~~ engaging surface and said side surface of said flywheel body and away from said imaginary flat ~~surface~~ plane.

20. A flywheel assembly as set forth in Claim 16, wherein said flywheel body comprises an inner portion defining a circular central hole, and an outer portion surrounding said inner portion of said flywheel body; said elastic plate comprises an outer portion which surrounds said inner portion of said elastic plate and which is fixed to said outer portion of said flywheel body; and said reinforcing member comprises ~~a smooth~~ an outer circumferential surface allowing said inner portion of said flywheel body to move axially toward said elastic plate without limiting an axial movement of the inner portion of said flywheel body toward said elastic plate.

21. A flywheel assembly as set forth in Claim 16, wherein said flywheel body comprises a side surface facing

toward said elastic plate, and said ~~engageable~~ engaging surface which faces away from said elastic plate; and said reinforcing member comprises a radially extending abutment surface held in contact with said elastic plate, and ~~a smooth~~ an outer circumferential curved surface which extends continuously ~~and smoothly~~ from said abutment surface to a curved surface end which is located axially between said side surface of said flywheel body and said ~~engageable~~ engaging surface of said flywheel body.

22. A flywheel assembly as set forth in Claim 21, wherein said ~~smooth~~ outer circumferential curved surface of said reinforcing member is a surface of revolution whose diameter increases ~~smoothly~~ continuously from said abutment surface of said reinforcing member to said curved surface end of said ~~smooth~~ outer circumferential curved surface.

23. A flywheel assembly as set forth in Claim 21, wherein said reinforcing member extends axially from a first member end defined by said abutment surface to a second member end which is located axially between said ~~engageable~~ engaging surface and said side surface of said flywheel body; and an axial distance of said second member end of said reinforcing member

from said abutment surface of said reinforcing member is smaller than an axial distance of said ~~engagement~~ engaging surface of said flywheel body from said abutment surface of said reinforcing member.

24. A flywheel assembly as set forth in Claim 21, said ~~engageable~~ engaging surface of said flywheel body extends in an imaginary flat ~~surface~~ plane; and said reinforcing member extends axially from a first member end defined by said abutment surface to a second member end which is located axially between said ~~engageable~~ engaging surface and said side surface of said flywheel body and which is away from said imaginary flat ~~surface~~ plane.

25. A flywheel assembly as set forth in Claim 24, wherein said flywheel body comprises an inner portion defining a circular central hole, and an outer portion surrounding said inner portion of said flywheel body; said elastic plate comprises an outer portion which surrounds said inner portion of said elastic plate and which is fixed to said outer portion of said flywheel body; said reinforcing member comprises a received portion which is received in said central hole of said flywheel body; and said outer ~~smooth~~ curved surface of

said reinforcing member extends ~~smoothly and~~ continuously from said abutment surface to said received portion.

26. A flywheel assembly as set forth in Claim 25, wherein said received portion of said reinforcing member comprises a cylindrical outside surface received in said central hole of said flywheel body, and the diameter of said ~~smooth~~ curved surface increases ~~smoothly and~~ continuously from said abutment surface to a diameter of said cylindrical surface of said reinforcing member.

27. A flywheel assembly as set forth in Claim 24, wherein said axial rigidity is in the range of 600 kg/mm to 1700 kg/mm.

28. A flywheel assembly as set forth in Claim 24, wherein an axial run-out of said ~~engageable~~ engaging surface when rotated by said crankshaft is no more than 0.1 mm.

29. A flywheel assembly as set forth in Claim 28, wherein said ~~engageable~~ engaging surface of said flywheel body is formed so as to make the axial run-out no more than 0.1 mm by processing said ~~engageable~~ engaging surface of said flywheel body in an

assembled state in which said crankshaft, said elastic plate, said flywheel body and said reinforcing member are assembled in a unit.

30. A flywheel assembly as set forth in Claim 24, wherein said side surface of said flywheel body comprises an outer side surface section which faces toward said elastic plate and which is fastened to an outer portion of said elastic plate and an inner side surface section which faces toward said elastic plate, which is surrounded by said outer side surface section of said flywheel body, and which is raised from said outer side surface section axially toward said elastic plate.

31. A flywheel assembly for a power transmission system for transmitting engine torque ~~to a driven unit~~, comprising:

a crankshaft;

an elastic plate comprising an inner portion secured to a shaft end of said crankshaft;

a flywheel body secured to said elastic plate and having an ~~engageable~~ engaging surface for engaging with a clutch disc; and

a reinforcing member for reinforcing said elastic plate at said inner portion of said elastic plate;

wherein said ~~engageable~~ engaging surface has an axial run-out which is no more than 0.1 mm; and

wherein said elastic plate is clamped axially between said reinforcing member and said shaft end of said crankshaft.

32. A flywheel assembly as claimed in Claim 31, wherein said flywheel body comprises an inner portion defining a circular central hole, and an outer portion surrounding said inner portion of said flywheel body; said elastic plate comprises an outer portion which surrounds said inner portion of said elastic plate and which is fixed to said outer portion of said flywheel body; said reinforcing member is fit in said central hole of said flywheel body with a clearance to form a loose fit; and said reinforcing member comprises ~~a smooth~~ an outer circumferential surface for allowing said inner portion of said flywheel body to move axially to said elastic plate without limiting an axial movement of the inner potion of said flywheel body toward said elastic plate.

33. A flywheel assembly as set forth in Claim 32, wherein said reinforcing member extends axially from a first member end defined by a radially extending abutment surface held in contact with said elastic plate, to a second member

end; said ~~smooth~~ outer circumferential surface of said reinforcing member extends continuously ~~smoothly~~ from said abutment surface toward said second member end of said reinforcing member; said ~~smooth~~ outer circumferential surface of said reinforcing member comprises an outer cylindrical surface section fit in said central hole of said flywheel body, and an outer ~~smooth~~ curved surface section which extends continuously ~~and smoothly~~ from said outer cylindrical surface section to said abutment surface; and said ~~smooth~~ curved surface section is a surface of revolution whose diameter decreases smoothly from a diameter of said cylindrical surface section toward said abutment surface.

34. A flywheel assembly as set forth in Claim 33, wherein said flywheel body comprises a side surface facing toward said elastic plate, and said ~~engageable~~ engaging surface which faces away from said elastic plate and which extends in an imaginary flat ~~surface~~ plane; and said second member end of said reinforcing member is located axially between said engageable surface and said side surface of said flywheel body and away from said imaginary flat ~~surface~~ plane.

35. A flywheel assembly as set forth in Claim 31,

wherein said flywheel body comprises an inner portion defining a circular central hole, and an outer portion surrounding said inner portion of said flywheel body; said elastic plate comprises an outer portion which surrounds said inner portion of said elastic plate and which is fixed to said outer portion of said flywheel body; and said reinforcing member comprises ~~a smooth~~ an outer circumferential surface allowing said inner portion of said flywheel body to move axially toward said elastic plate without limiting an axial movement of the inner potion of said flywheel body toward said elastic plate.

36. A flywheel assembly as set forth in Claim 31, wherein said flywheel body comprises a side surface facing toward said elastic plate, and said ~~engageable~~ engaging surface which faces away from said elastic plate; and said reinforcing member comprises a radially extending abutment surface held in contact with said elastic plate, and ~~a smooth~~ an outer circumferential curved surface which extends continuously ~~and smoothly~~ from said abutment surface to a curved surface end which is located axially between said side surface of said flywheel body and said ~~engageable~~ engaging surface of said flywheel body.

37. A flywheel assembly as set forth in Claim 36, wherein said ~~smooth~~ outer circumferential curved surface of said reinforcing member is a surface of revolution whose diameter increases ~~smoothly~~ continuously from said abutment surface of said reinforcing member to said curved surface end of said ~~smooth~~ outer circumferential curved surface.

38. A flywheel assembly as set forth in Claim 36, wherein said reinforcing member extends axially from a first member end defined by said abutment surface to a second member end which is located axially between said ~~engageable~~ engaging surface and said side surface of said flywheel body; and an axial distance of said second member end of said reinforcing member from said abutment surface of said reinforcing member is smaller than an axial distance of said engagement surface of said flywheel body from said abutment surface of said reinforcing member.

39. A flywheel assembly as set forth in Claim 36, said ~~engageable~~ engaging surface of said flywheel body extends in an imaginary flat ~~surface~~ plane; and said reinforcing member extends axially from a first member end defined by said abutment surface to a second member end which is located axially

between said ~~engageable~~ engaging surface and said side surface of said flywheel body and which is away from said imaginary flat ~~surface~~ plane.

40. A flywheel assembly as set forth in Claim 39, wherein said flywheel body comprises an inner portion defining a circular central hole, and an outer portion surrounding said inner portion of said flywheel body; said elastic plate comprises an outer portion which surrounds said inner portion of said elastic plate and which is fixed to said outer portion of said flywheel body; said reinforcing member comprises a received portion which is received in said central hole of said flywheel body; and said outer ~~smooth~~ curved surface of said reinforcing member extends ~~smoothly and~~ continuously from said abutment surface to said received portion.

41. A flywheel assembly as set forth in Claim 40, wherein said received portion of said reinforcing member comprises a cylindrical outside surface received in said central hole of said flywheel body, and the diameter of said ~~smooth~~ curved surface increases ~~smoothly and~~ continuously from said abutment surface to a diameter of said cylindrical surface of said reinforcing member.

42. A flywheel assembly as set forth in Claim 39, wherein said ~~engageable~~ engaging surface of said flywheel body is formed so as to make the axial run-out no more than 0.1 mm by processing said ~~engageable~~ engaging surface of said flywheel body in an assembled state in which said crankshaft, said elastic plate, said flywheel body and said reinforcing member are assembled in a unit.

Add A1

Add A2